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(Reaffirmed 2018)

भारतीय मानक

पोतनिर्माण — अंतर्देशीय नौचालना के लिए वेल्डित इस्पात के डमरू नौबंध — विशिष्टि

Indian Standard

SHIPBUILDING — WELDED STEEL DOUBLE BOLLARDS FOR INLAND NAVIGATION — SPECIFICATION

ICS 47.060

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BUREAU OF INDIAN STANDARDS
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July 2013 **Price Group 4**

Shipbuilding Sectional Committee, TED 17

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards after the draft finalized by the Shipbuilding Sectional Committee had been approved by the Transport Engineering Division Council.

While formulating this standard, considerable assistance has been derived from ISO 3913 : 1977 Addendum 1 'Shipbuilding — Welded steel bollards, Addendum 1 : Double bollards for inland navigation', issued by the International Organization for Standardization.

This standard is one of a series of Indian Standards on bollards. Other standards in the series are as follows:

IS No.	*Title*
3381 : 1965	Specification for cast vertical bollards with and without lugs
4374 : 1980	Specification for mild steel fabricated vertical bollards with and without lugs (*first revision*)
5240 : 1969	Cast skew bollards
5625 : 1970	Cast cruciform bollards

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

SHIPBUILDING — WELDED STEEL DOUBLE BOLLARDS FOR INLAND NAVIGATION — SPECIFICATION

1 SCOPE

1.1 This standard specifies requirements for welded double bollards used on vessels for inland waterways. It lays down the materials and construction for a range of nominal sizes 70 to 500 and states the maximum loading for which the bollards are intended.

1.2 The method of construction and details of welding are not specified, but each manufacturer shall ensure the necessary strength of the bollards. Loading tests shall be performed as described in **8**.

1.3 Cast vertical bollards with and without lugs for use in ships are covered separately in IS 3381 : 1965 'Specification for cast vertical bollards with and without lug'.

2 TERMINOLOGY

For the purpose of this standard, the following definition shall apply.

2.1 Nominal Size — The nominal size of a bollard shall be denoted by a reference to the outside diameter of the barrel in terms of the nearest number drawn from a basic series of preferred numbers.

3 CLASSIFICATION

3.1 Types

Depending on the construction, following two types of welded double bollards are to be distinguished:

a) *Type A* — Vertical with lugs; and
b) *Type B* — Cruciform.

3.2 Forms

Depending on the method of installation, following two forms of bollards are to be distinguished:

a) *Form I* — With baseplate; and
b) *Form II* — Built-in bollards.

3.3 Nominal Sizes

The nominal size, D_n of a bollard shall be denoted by reference to the outside diameter of the bitts in terms of the nearest number drawn from a basic series of preferred numbers. The nominal sizes are:

70, 90, 100, 125, 160, 200, 250, 315, 400 and 500.

4 DIMENSIONS AND LOADING

4.1 Welded steel bollards shall have dimensions and loading particulars in accordance with Table 1 and Figs. 1, 2 and 3.

4.2 The values of maximum loading given in Table 1 refer to a single mooring rope wound in 'figure-of-eight' fashion around the bitts; the application of two ropes with loadings as given in Table 1 is also permitted (*see also* Fig. 4).

A single rope may be used with a load twice that given in Table 1 (*see also* Fig. 5).

5 MATERIAL

The bollards shall be made from weldable quality steel having a tensile strength of 360 N/mm^2 minimum or 410 N/mm^2 minimum for specified thicknesses of bitts made from tube or plate as given in Table 1.

6 CONSTRUCTION

6.1 The details of construction of the bollard, including welding details, shall be determined by the manufacturer to comply with the requirements of this standard.

6.2 The bitts of the bollards shall be constructed from steel tubes or formed from plate.

6.3 The baseplate of bollards shall be made according to Fig. 1 and Fig. 2. The method of fixing built-in bollards shall be determined by the manufacturer.

6.4 The type and dimensions of welds shall be determined by the manufacturer. The welds connecting the bollards with the deck shall guarantee reliable transmission of the maximum loading of the bollards without any plastic deformation and cracks.

6.5 If an oval eyeplate is required to be fitted to the baseplate for the purpose of securing a chain or rope stopper, the strength of the eyeplate should be equal to one-quarter of the strength of the maximum loading appropriate to the nominal size of the bollard.

7 QUALITY OF MANUFACTURE

7.1 All surfaces of the bollard, including welds, shall

Table 1 Dimensions and Loads of Bollards

(*Clauses* 4.1, 4.2 *and* 5)

Sl No.	**Nominal Size** D_n	***D*1)**	***t* Specified**				$D_1 \times t_1$	***E*2)**	***F*2)**	***G***	***H***	H_1	***D***	d_1	***E***	***h*2)**	h_1	h_2	***L***	l_1	***R***
			Tube		Plate																
			360 N/mm^2 *Min*	410 N/mm^2 *Min*	360 N/mm^2 *Min*	410 N/mm^2 *Min*	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
i)	70	70.0	5.9	5.9	5.9	5.9	38 × 4.0	135	310	315	110	140	90	50	10	40	35	67	175	20	6
ii)	90	88.9	8	8	8	8	44.5 × 4.0	145	400	405	140	180	110	60	10	50	45	85	240	25	6
iii)	100	114.3	10	10	10	10	57 × 6.3	150	450	495	160	220	140	75	10	75	50	105	250	30	8
iv)	125	139.7	10	10	10	10	70 × 6.3	190	560	630	200	280	170	90	10	80	65	135	315	35	8
v)	160	168.3	10	10	10	10	82.5 × 6.3	250	720	810	260	350	200	110	10	90	85	170	400	45	8
vi)	200	219.1	12.5	11	10	10	108 × 8.0	300	900	990	310	440	265	145	15	100	100	215	500	50	10
vii)	250	273.0	14.2	12.5	12	11	139.7 × 8.0	380	1 130	1 260	392	510	325	180	15	125	125	250	630	60	14
viii)	315	323.9	17.5	16	16	15	168.3 × 8.0	480	1 430	1 620	496	670	395	230	20	150	160	325	800	75	16
ix)	400	406.4	22.2	20	19	18	219.1 × 10.0	600	1 800	2 025	620	835	500	310	25	175	200	410	1 000	90	18
x)	500	508.0	25	22.2	22	20		750	2 250		772		620		30	200	250		1 250	120	24

1) Outside diameter tolerances of bollard bitts (*D*), made of tube or steel plate, are ± 1 percent.

2) Dimensions *E*, *F* and *h* are given for guidance only.

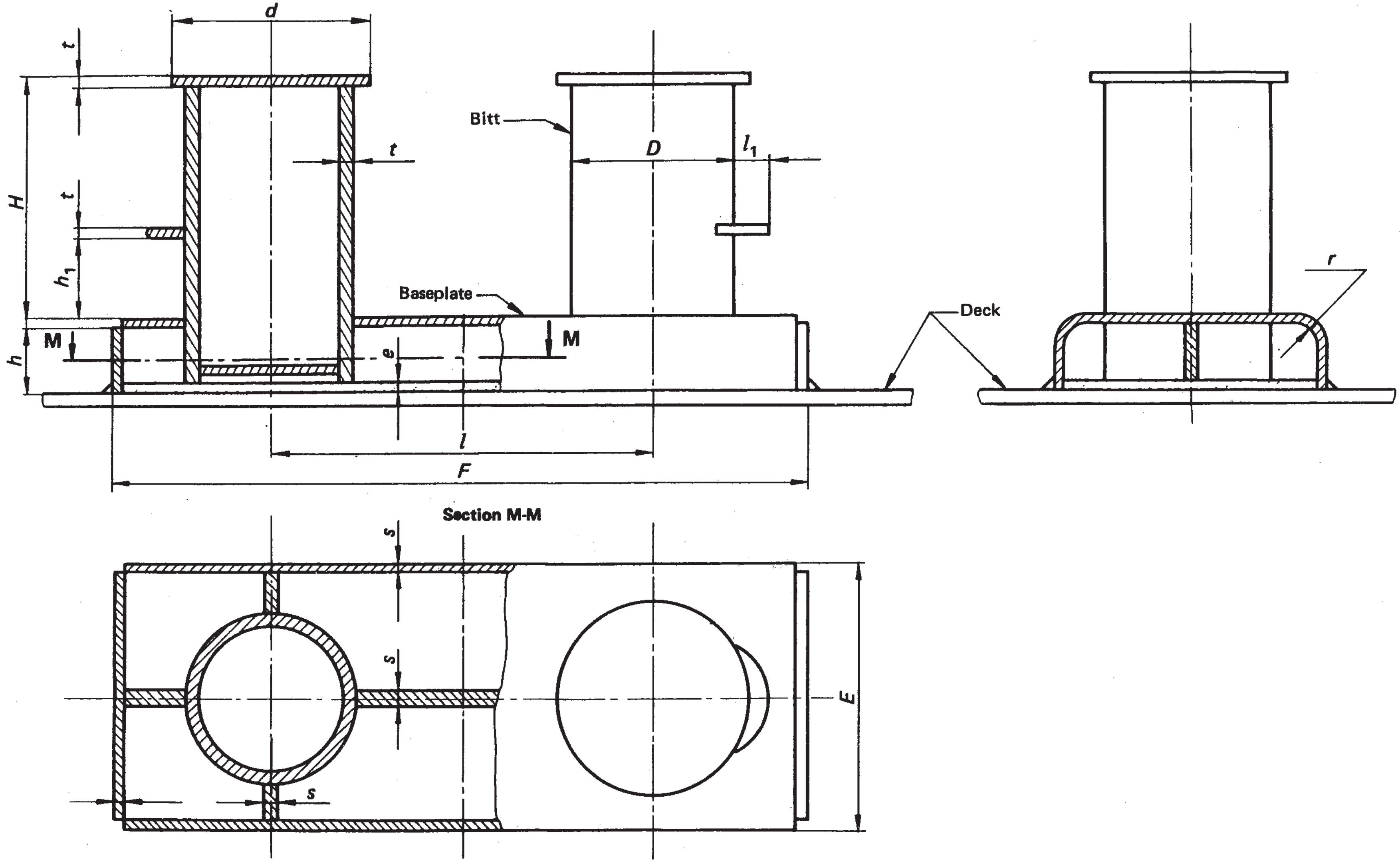


FIG. 1 VERTICAL BOLLARD WITH BASEPLATE — TYPE A, FORM I

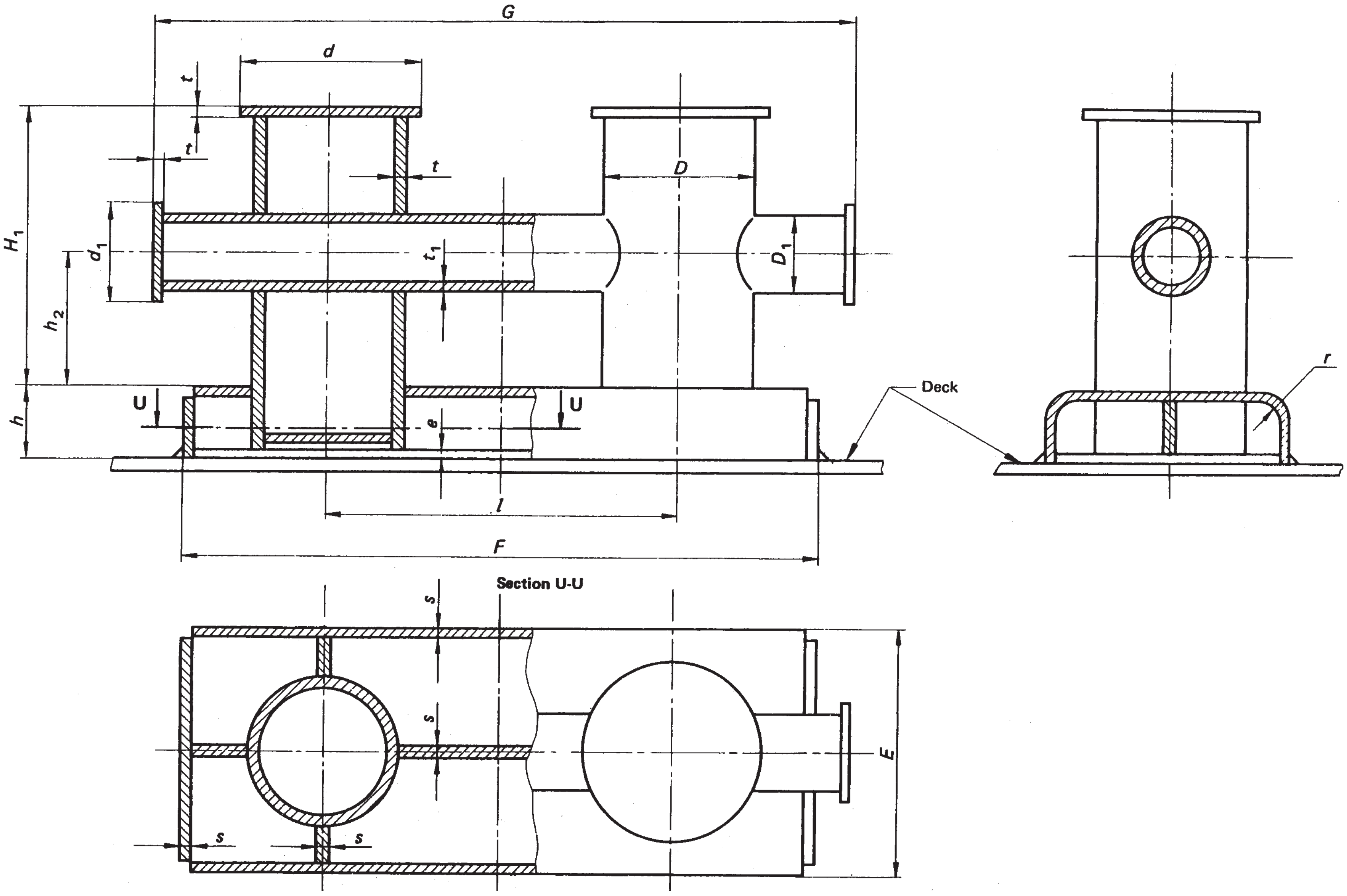
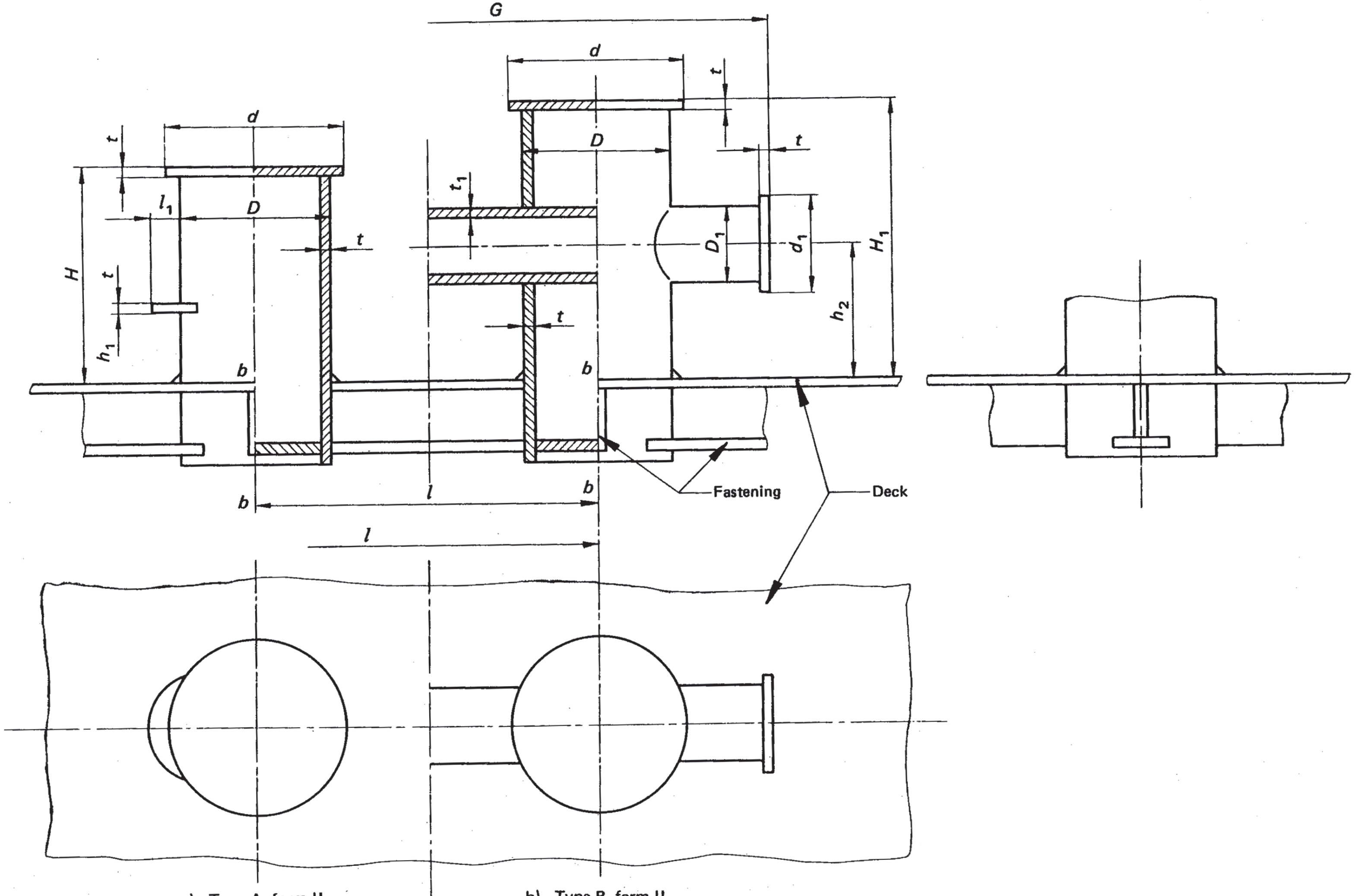


FIG. 2 CRUCIFORM BOLLARD WITH BASEPLATE — TYPE B, FORM I



a) Type A, form II

b) Type B, form II

FIG. 3 BUILT-IN BOLLARDS — VERTICAL AND CRUCIFORM TYPES

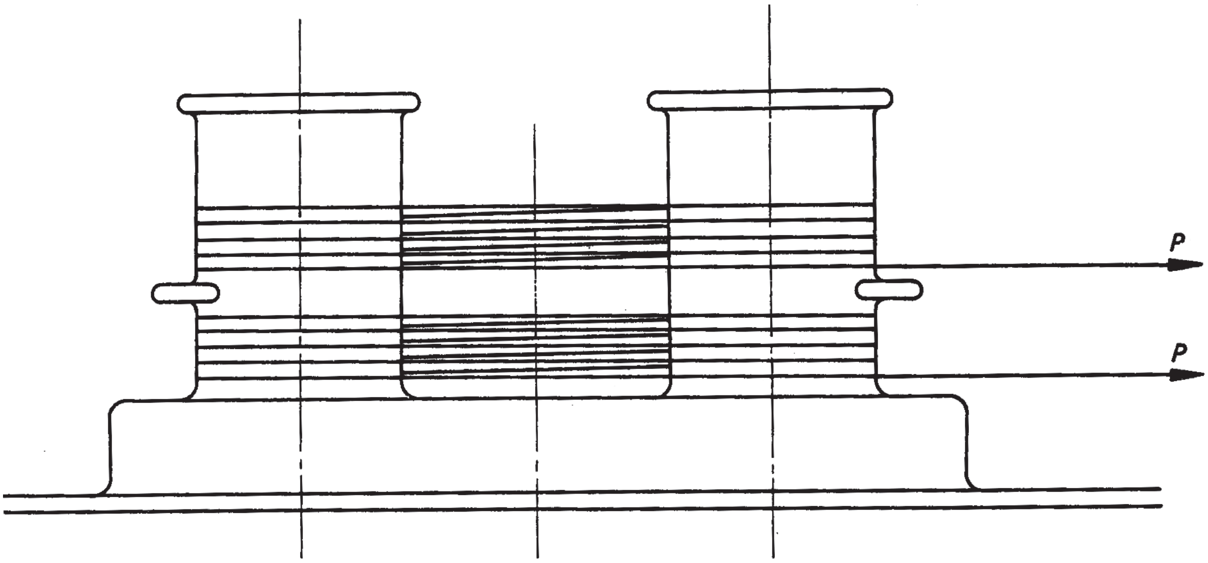


FIG. 4 BOLLARD TEST WITH TWO ROPES

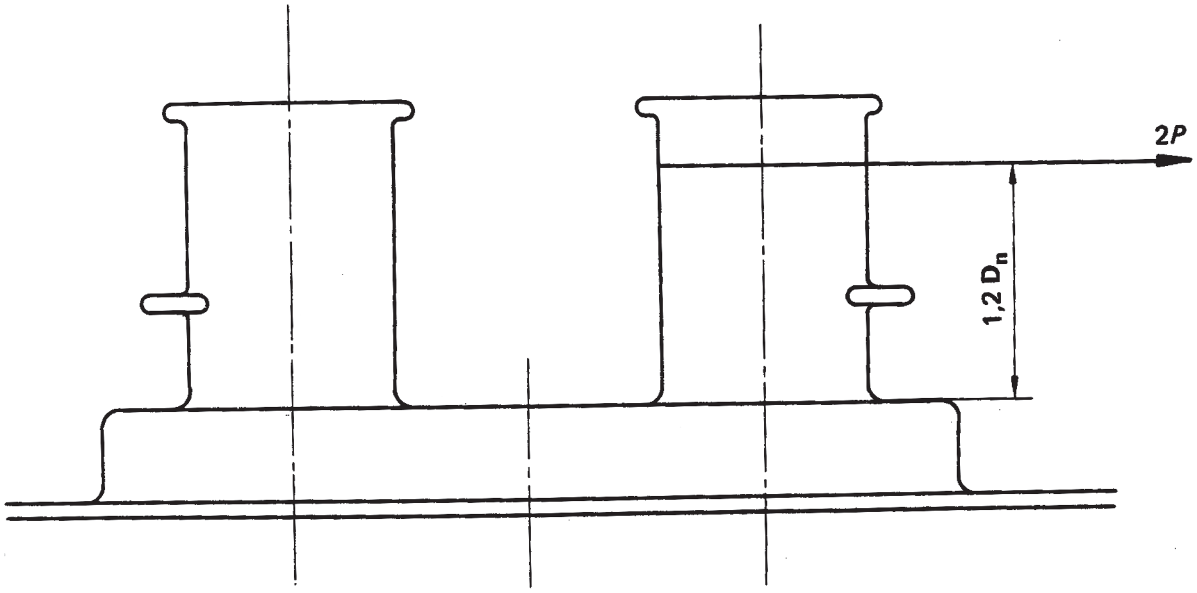


FIG. 5 BOLLARD TEST WITH ONE ROPE

be free from any visible flaws or imperfections.

7.2 All surfaces in contact with ropes shall be free from surface roughness or irregularities likely to cause damage to the ropes by abrasion.

7.3 After mounting on deck, the bollards shall be coated externally with an anti-corrosive protective finish.

8 LOADING TESTS

8.1 After mounting on deck, each nominal size of bollard shall be type-tested by the manufacturer to prove the construction and quality adopted.

8.2 The test shall be applied by one of the following methods:

a) Mounting two ropes in 'figure-of-eight' fashion (*see* Fig. 4) and inducing loads simultaneously in each rope to the value for the nominal size of bollard given in Table 1, or

b) Mounting a single rope on one bitt at a height of 1.2 D_n above the top of the baseplate (*see* Fig. 5) and applying twice the appropriate loading value given in Table 1. The test shall be repeated on the other bitt.

8.3 After the application of the loading test, the bollards shall be examined to ascertain that,

a) no change occurs in the centre-to-centre dimension (l) measured across the tops of the bitts;

b) no part of the bollard shows any signs of permanent deformation or failure; and

c) all principal welds are free from cracks and flaws.

9 MARKING

9.1 Double bollards shall be marked with nominal size and identification mark of the manufacturer.

9.2 BIS Certification Marking

The bollards may also be marked with the Standard Mark.

9.2.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act*, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

Bureau of Indian Standards

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